**Small Business Innovation Research/Small Business Tech Transfer**

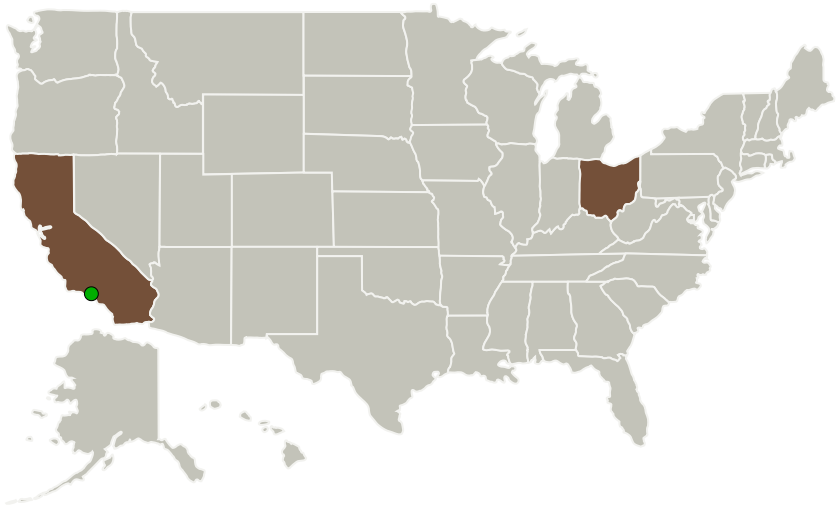
# Ultra-Lightweight MG Syntactic for Insulation in Extreme Environments, Phase I

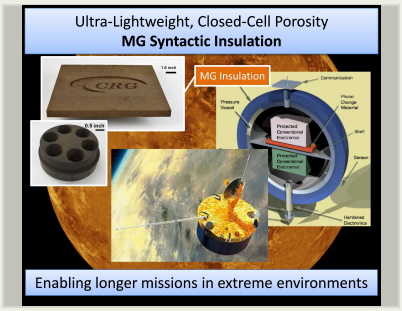
Completed Technology Project (2017 - 2017)

## Project Introduction

CRG proposes to demonstrate MG Syntactic as an incompressible, block-format, high-temperature insulation material for future Venus landers, Jupiter atmospheric probes, and other harsh environment space exploration applications. The MG Syntactic insulation includes a combination of (1) CRG's proprietary high temperature stable MG Resin as a binder, (2) light weight and high temperature insulation fillers for reduced weight and thermal conductivity, and (3) fiber reinforcements for structural performance as needed. The resulting material is incompressible, inherently tough compared with microporous ceramics, machinable, easy to work with, and highly conformable. Most importantly, its density is approximately 25% that of its ceramic counterparts and its porosity is closed-cell so the density of the gas environment that it's in should have no bearing on its thermal conductivity. All of these benefits translate to a lighter weight, more reliable insulation system in support of longer mission durations.

## Primary U.S. Work Locations and Key Partners






Ultra-Lightweight MG Syntactic for Insulation in Extreme Environments, Phase I Briefing Chart Image

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# Ultra-Lightweight MG Syntactic for Insulation in Extreme Environments, Phase I

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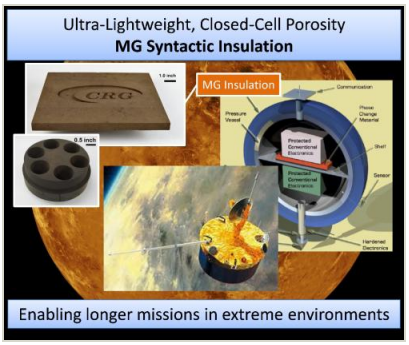
| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Cornerstone Research Group, Inc. | Lead Organization | Industry | Miamisburg, Ohio |
| Jet Propulsion Laboratory(JPL) | Supporting Organization | NASA Center | Pasadena, California |

| Primary U.S. Work Locations | |
|---|---|
| California | Ohio |

## Images




**Briefing Chart Image**
Ultra-Lightweight MG Syntactic for Insulation in Extreme Environments, Phase I Briefing Chart Image
*(https://techport.nasa.gov/image/126970)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Cornerstone Research Group, Inc.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

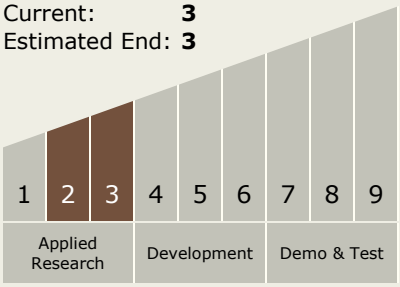
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Brian E Henslee

## Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



# Ultra-Lightweight MG Syntactic for Insulation in Extreme Environments, Phase I

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## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.4 Insulation and Interfaces

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System